

REMARKS

The present application was filed on September 21, 2005 as a national phase filing under 35 U.S.C. §371 based on International Application No. PCT/FI2003/000575. The national phase filing was accompanied by a Preliminary Amendment wherein claims 1-35 from the international application were cancelled without prejudice and new claims 36-72 were presented. Claims 36-72 were thus pending in the present application prior to this response.

In a Restriction Requirement dated November 25, 2008, the Examiner required restriction of claims 36-72 of the above-referenced application to one of the following groups of claims: claims 36-55 and 72 (Group I); and claims 56-71 (Group II). The Examiner also required election of a species: claims 36-51 (Species A); claims 52-55 (Species B); and claim 72 (Species C). In response thereto, Applicants elected with traverse the claims of Species A in Group I, i.e., claims 36-51.

In the present Office Action, the Examiner has: (i) made final the Restriction Requirement; and (ii) rejected claims 36-51 under 35 U.S.C. §103(a) as being allegedly unpatentable in view of U.S. Patent No. 6,703,689 (hereinafter “Wada”).

In the present response, Applicant has cancelled the non-elected/withdrawn claims, i.e., 52-72. In addition, claims 36-38 are cancelled, claims 39 and 40 are amended and now presented as independent claims. Dependent claims 41, 42, 44 and 47-49 are amended to adjust for dependencies. New independent claims 73 and 74 are also added.

Regarding the §103(a) rejection of claims 39-51, Applicant respectfully traverses said rejection since Wada fails to teach or suggest each and every feature of the claimed invention.

For example, independent claim 39 now recites a combination of the features previously found in claims 36-39. Applicant submits that the features found in previous claim 39, in particular, are not disclosed in Wada. These features require that in addition to the formation of a conductive via for each photodetector of a plurality of photodetectors from one surface of the substrate to the other surface of the substrate, for at least one of the conductive vias there is then additionally formed a further conductive element which extends from the first surface to the second surface. This feature allows for the electrical connection of another element from the upper surface of the substrate to the lower surface of the substrate, in addition to the connection provided for the active area of the

photodetector by the conductive via itself. There is no disclosure of such feature in Wada. Wada simply discloses the formation of a single conductive via, which connects an active area on an upper surface of the substrate to the lower surface of the substrate. No other conductive element is shown as being formed within the substrate hole which provides the conductive via.

Further, independent claim 40 now recites a combination of the features of previous claims 36-38 and 40. While Wada would appear to disclose (for example with reference to Figure 12) that there is material which is partly formed within the opening in which the conductive via is formed, this does not fill any conductive via. Thus, it is clear that Wada does not provide a filling material within at least one of the conductive vias. Rather, Wada provides a material which partly enters a conductive via. The filling of the opening with a material offers technical advantages. The numerous holes which are formed throughout the substrate are completely filled, and therefore increase the mechanical robustness of the substrate. It is noted that in Wada the material which enters the hole would appear to be a side-effect of the formation of forming materials on either the upper or lower surface of the substrate, and does not appear to be formed specifically for the purpose of filling the hole, as can be understood by the fact that the material does not actually fill the hole.

Newly added independent claim 73 corresponds to the combination of claims 36-38 and 40 previously presented, with the additional inclusion of the filling material being a photoresist material filling the opening, support for which can be found in the PCT application as published at column 7, lines 18 to 19 and column 7, line 24 (which served as the specification of the present national phase filing). As noted above with respect to claim 40, Wada does not disclose any material which fills the opening within at least one of the conductive vias. For this reason alone claim 73 is distinct over Wada. Further, the use of photoresist material to fill the holes has distinct advantages. It is a technologically simple process, which minimises cost and speeds up processing. The photoresist material filling the hole can be etched back to provide a planar surface of the surface of the hole, which provides for the formation of further layers – if desired – on the surface of the substrate.

Newly added claim 74 corresponds to the combination of claims 36-39 as previously presented, and with the addition of a further feature which is found at page 9, lines 26 to 28 and page 10, lines 4 to 12 of the published PCT application. As discussed hereinabove with reference to claim

39, there is no disclosure in Wada of providing a further conductive element within the conductive via. Claim 74 is still further distinct over Wada, as providing a specific purpose for this further conductive element, to allow connection of a guard ring to the under surface of the substrate. This additional feature offers a technical benefit over an arrangement such as Wada. In existing arrangements, where guard rings are provided, additional conductors and contact pads are necessary in order to provide connection to the guard rings. Independent claim 74 provides for the guard rings to be connected to the underside of the substrate, utilizing the existing conductive vias and further conductive elements formed therein, such that contacts for the guard rings are not required on the upper surface, and thus generally providing an improvement to a photodetector array where guard rings are utilized.

Applicant asserts that independent claims 39, 40, 73 and 74 are patentable over Wada for at least the reasons given above. Applicant also asserts that dependent claims 41-51 are patentable over Wada not only for the reasons given above with respect to independent claim 39 from which they directly or indirectly depend, but also because one or more of said dependent claims recites separately patentable subject matter.

Applicant respectfully reminds the Examiner to provide, in the next correspondence, an initialed copy of the PTO/SB/08a forms respectively filed with the Information Disclosure Statements filed on May 1, 2009 and July 28, 2009.

The Examiner is invited to contact the undersigned attorney to discuss any points raised in this response. Applicant asserts that claims 39-51, 73 and 74 of the present application are in condition for allowance, and request favorable reconsideration.

Respectfully submitted,



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